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MARKETING FRUITS AND VEGETABLES

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October 1966

MARKETING FRUITS AND VEGETABLES 1/

INTRODUCTION

More than 100 fresh fruits and vegetables, and products processed from them, are available to customers of American retail food stores. From this imposing array, civilians purchased nearly $15 billion worth (in retail food store prices) in 1965, an increase of 278 percent over 1929. These fruits and vegetables, originating from more than 50 million tons of farm production, were moved to consumers by a marketing system that is an outstanding example of the mid-20th century technological revolution. But as the marketing system expanded, so did the cost of moving fruits and vegetables from producers to consumers. In 1929, the marketing bill for moving fruits and vegetables worth $1.2 billion (farm value) was $2.7 billion. In 1965, consumers paid $10.7 billion for marketing services to obtain fruits and vegetables worth $4.0 billion.

These statistics give some indication of the magnitude of the fruit and vegetable industry and the changes it has experienced in the 37-year period 1929 to 1965.

CHANGES IN CONSUMPTION OF FRUITS AND VEGETABLES

Reasons for change in the marketing of fruits and vegetables include such broad social and economic forces as population growth, rising standards of living, increased urbanization, and changes in consumers' tastes. Specific factors accounting for changes include such developments as new and improved varieties of crops, new areas of production, improved technology in production and processing, more rapid and efficient communication facilities, better packages, refrigeration, and faster and more dependable transportation. While cause and effect are difficult to pinpoint, the net overall result has been a shift in consumption from fresh to processed forms of fruits and vegetables.

The annual per capita consumption of fruits, vegetables, melons, potatoes, and sweetpotatoes in all forms increased from 473 pounds (fresh-weight equivalent at retail) in 1929-33 to a high of 552 pounds in 1944-48, dropped sharply in the early 1950's, and remained relatively stable at about 500 pounds per person through 1965 (table 1).

Shifts have occurred during the 35-year period in the proportion of fruit consumed fresh, frozen, canned, and dried. While per capita consumption of fresh and dried fruits declined, consumption of canned and frozen fruit and fruit juices increased. Consumption of fruit in all forms declined in the early sixties.

Per capita consumption of commercial vegetables and melons averaged about 40 percent more in 1965 than in 1929-33. Consumption trended upward from the early thirties to the end of World War II, declined slightly in the late forties, and has increased slowly since. Striking changes in the form in which vegetables reach the consumer occurred during this period, the trend being toward increased quantities of processed items.

Consumption of commercial fresh vegetables (not including melons) increased through World War II and then declined to a level below that of the early thirties.

1/ Sections were written by Robert W. Bohall, Alfred J. Burns, John H. Droge, Victor G. Edman, Donald G. Gillette, Joseph C. Podany, and Jules V. Powell, Agricultural Economists.

Table 1.--Fruits, vegetables, melons, potatoes, and sweetpotatoes: Per capita consumption, fresh weight equivalent at retail, United States, 5-year averages, 1929-63; annual data for 1964 and 1965

Year	Fruits 1/		Vegetables 2/		Melons 3/	Potatoes and sweetpotatoes 4/		All fruits, vegetables, melons, potatoes, and sweetpotatoes
	Fresh	Processed 5/	Fresh	Processed 6/	Fresh	Fresh 7/	Processed 8/	All forms
5-year average:	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
1929-33	127.0	36.0	92.4	44.9	25.9	148.3	0.1	472.6
1934-38	129.4	44.2	95.4	49.5	23.4	142.5	.1	484.5
1939-43	135.8	57.4	98.4	66.6	20.8	132.7	.3	512.0
1944-48	134.1	75.6	106.9	82.7	24.8	127.7	.6	552.4
1949-53	111.3	84.8	95.2	85.9	22.8	107.8	1.6	509.4
1954-58	94.4	98.9	92.3	94.3	24.1	104.2	3.9	512.1
1959-63	85.3	101.0	94.8	101.1	22.1	101.9	9.5	515.7
1964	79.4	90.1	92.1	105.1	21.0	97.1	15.5	500.3
1965 9/	81.5	97.2	92.4	104.1	21.8	90.7	16.3	504.0

1/ Civilian consumption only, beginning 1941.
2/ Excludes home-garden production, and quantities used in soups and baby food. Civilian consumption only, beginning 1941.
3/ Excludes home-garden production.
4/ Includes farm-garden production, but excludes nonfarm garden production. Civilian consumption only, beginning 1941.
5/ Includes canned, canned juice, frozen, frozen juice, and dried. 6/ Includes canned and frozen.
7/ Includes small quantity of potatoes used in mixtures, flour, dehydrated potatoes, chips, and shoestring potatoes. Includes all sweetpotatoes other than canned.
8/ Includes canned and frozen potatoes and canned sweetpotatoes. 9/ Preliminary.

Source: Hiemstra (1, 2). Underscored numbers in parentheses refer to Literature Cited, p.213.

Meanwhile, per capita consumption of commercially processed vegetables more than doubled. Per capita consumption of a few items used mainly in the fresh form, such as lettuce and escarole, has continued to increase since World War II. But for many items used in both fresh and processed forms, consumption of the fresh form has declined. On a fresh-weight-at-retail basis, processed items represented about one-third of total per capita consumption of commercially grown vegetables in the early thirties and slightly more than half in the early sixties.

Total consumption of potatoes and sweetpotatoes per capita has declined sharply since 1929. Consumption of processed potatoes and sweetpotatoes is increasing rapidly; however, the fresh form still comprises a much larger part of total consumption than the processed form.

CHANGING PRICE RELATIONSHIPS

There are several reasons for the shift in consumption from fresh to processed fruits and vegetables. One is the increased demand for "built-in" services in food that accompanies the rise in consumer income--the income elasticity of these services is considerably higher than that of food itself. Another reason is that some processed products appeal more to consumers' tastes than fresh products. Also, the consumer pays less for some foods in the processed form. From 1953 through 1965, retail prices for fresh fruits and vegetables increased 37 percent, compared with an increase of 9 percent for processed products. In the same period,

the farm-retail spread for fresh fruits and vegetables increased 37 percent, while the increase in the spread for processed produce was 5 percent. Since the farm-retail spread is a measure of the cost of marketing, it is apparent that marketers of fresh produce have not been able to improve technology and utilize economies of scale to the extent that processors have.

PRICES AND SPREADS

The retail value of farm commodities is shared by two groups--producers and marketing agents. Concern regarding the portion received by each is not a recent development. Early in the agricultural history of the United States, the task of marketing farm products began to shift from producers to specialized marketing agents. As a consequence, producers received only a portion of the retail price and they soon had doubts as to the equity of their share. Marketing agents also became increasingly aware of their shares as the scope and complexity of marketing increased. In response to the growing need for information on the division or sharing of the retail value of farm products, the U.S. Department of Agriculture developed a broad, continuing research program in this area. The basic statistics that were developed include the retail prices of a number of commodities and commodity groups, the farm values and farmers' share, and the farm-retail spread.

This spread is the difference between the retail price and the farm value of an equivalent quantity of the commodity. It is the amount received by institutions that perform services in moving agricultural products from producers to consumers. It may be further divided into the shares of each marketing function or into other breakdowns.

The retail cost (price) index for fruits and vegetables increased from 79 in 1947 to 113 in 1965 (1957-59=100). 2/ This was a 43-percent increase compared with an increase in the consumer price index of 41 percent for "all items" and 34 percent for "food." 3/ In general, the levels and movements were similar for the three indexes (fig. 1). However, the fruit and vegetable index fluctuated more. In the 1947-65 period, average annual retail prices were higher than those for the preceding year 12 times, and lower 5 times. From 1947 to 1965, the farm value increased 44 percent, and the farm-retail spread increased 83 percent (fig. 2).

CHANGES IN PROCESSING TECHNOLOGY

Shifts in consumption from fresh to processed fruits and vegetables have been associated with changes in production areas, changes in processing technologies, and changes in the structure of the processing industries.

The 1964 output of industries processing fruits and vegetables was 76 percent higher than the 1947-49 average (10). 4/ Plants producing frozen fruits and vegetables increased output relatively more than canning and preserving plants. The index of output of frozen fruits and vegetables (1947-49=100) was 486 in 1964, compared with an index of 145 for canned fruits and vegetables. However, actual output increased more in canning than in freezing.

2/ As measured by all fruit and vegetable items in the USDA market basket of farm food products.

3/ Mimeographed releases from the Bureau of Labor Statistics, U. S. Department of Labor.

4/ Underscored numbers in parentheses refer to Literature Cited, p. 213.

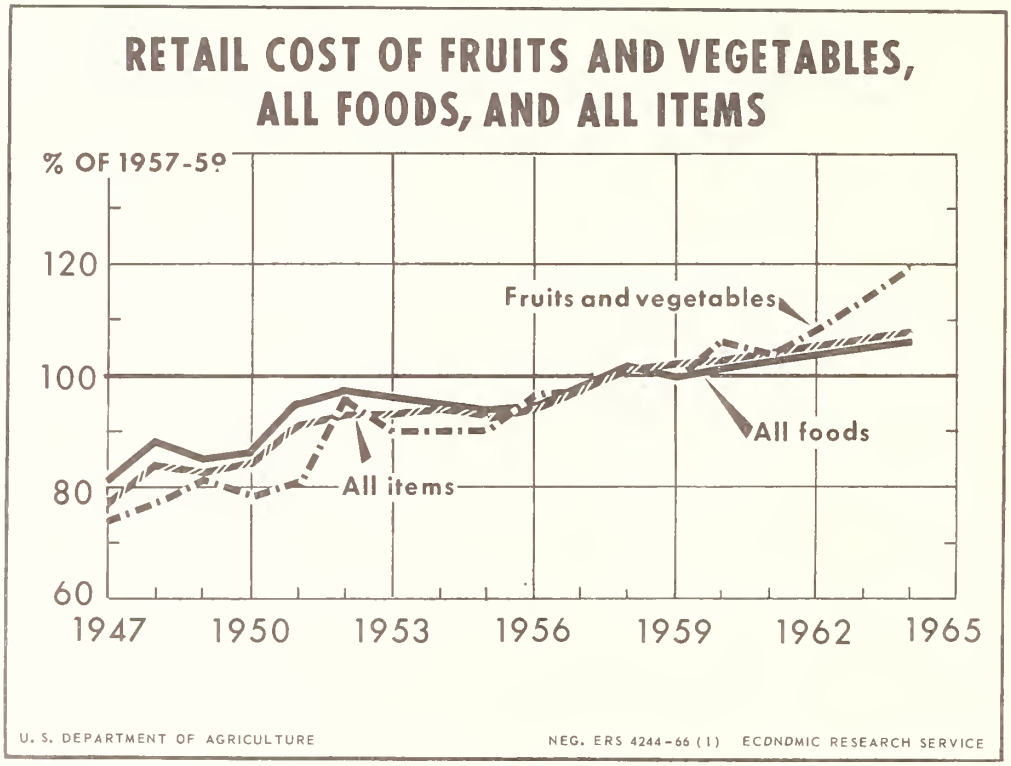


Figure 1

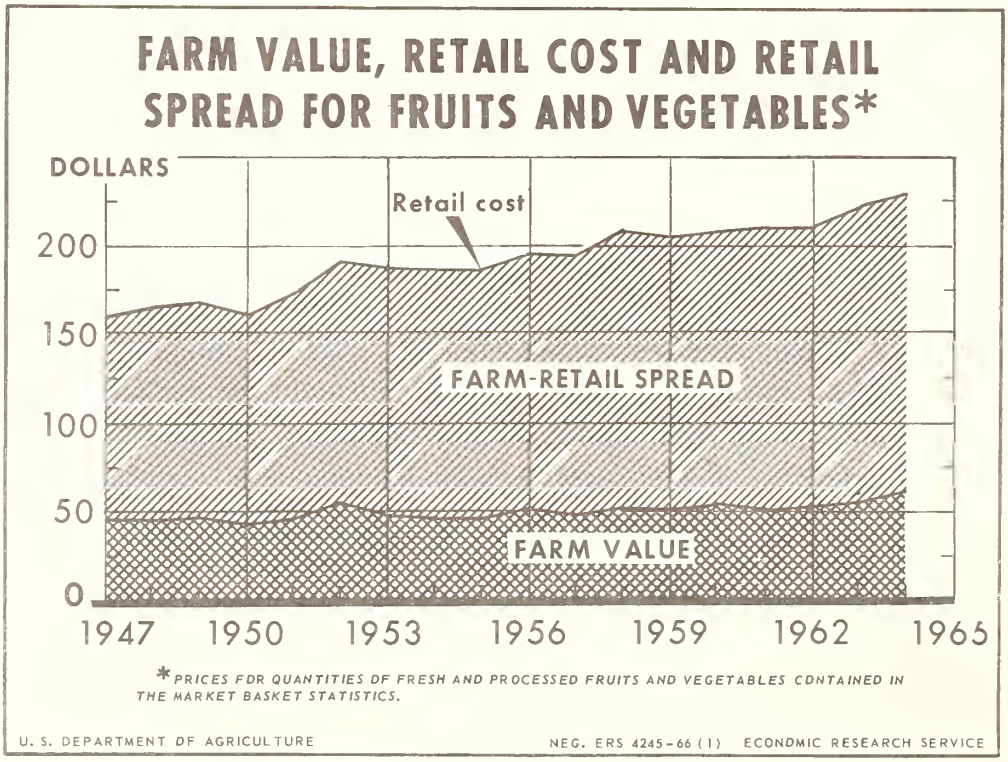


Figure 2

The number of plants (establishments) drying and freezing fruits and vegetables was larger in the midsixties than 20 years earlier, but fewer plants were canning these products. In 1963, 175 establishments were dehydrating fruits and vegetables. The value of their production was about $321 million. There were 653 fruit and vegetable freezing establishments, and the value of their production was $1.5 billion. During the 1950's and early sixties, the number of fruit and vegetable canning establishments declined about 40 percent, but the value of their production nearly doubled.

Fewer establishments in the canning industry do not necessarily indicate less total canning plant capacity. Many fruit and vegetable canning firms have built new plants and modernized or enlarged existing facilities. Since a company generally builds a plant or changes equipment to accommodate an expected increase in output, new or modernized plants often are larger than plants they replace. In some instances, new equipment and processes were suitable only for relatively large plants.

Entry into the fruit and vegetable processing industry is relatively easy compared with entry into many other industries, but competition is keen. Large firms in the canning and freezing industries have a smaller share of total sales than in many other food manufacturing industries. The 4 largest fruit and vegetable canning companies made 29 percent of industry sales in 1958, a slight increase from 27 percent in 1947; the 20 largest companies made 55 percent of total sales, up from 46 percent in 1947 (7). The 4 largest freezing companies accounted for 31 percent of total industry sales in 1958, compared with 39 percent in 1954 (the earliest year for which data are available). In the dehydrated fruit and vegetable industries, the 4 largest firms had 45 percent of the total sales in 1958 and 26 percent in 1947. Concentration in the dehydrating industry has increased because of increased equipment requirements of new, faster methods of dehydrating.

The location of the fruit and vegetable canning industry, as indicated by census data on value added by manufacture in various regions, appears to have remained rather steady in the 1950's. Slight decreases in the percentage of total value added in the Middle and South Atlantic Regions were offset by increases in the East North Central and Western Regions. In the freezing industry, the percentage of the total value added by manufacture declined in the Middle Atlantic, West South Central, and Western Regions, but increased in New England (because of greatly expanded freezing of potatoes) and the South Atlantic Region.

Western States account for much of the output of processed deciduous fruits. Practically all of the dried fruit and about 75 percent of the canned and other processed deciduous fruit are produced there. Florida leads in production of processed citrus fruits. The Western Region also leads in the volume of vegetables processed. Much of the increase in that region has been in frozen vegetables. The North Central Region produces a large share of the canned vegetables.

The States engaged in commercial fruit and vegetable canning and freezing operations in 1963 are ranked in tables 2 and 3 by number of processing establishments. California and New York rank first and second in each list. The ordering of States would be changed considerably if the criterion used were "value added by manufacture," because of the difference in processing requirements for fruit and vegetable commodities.

Output per man-hour in 1964 was 67 percent greater than in 1947-49 in plants processing fruits and vegetables (11). Improvements in plant and equipment accounted for much of this increase. New plants generally were designed to improve efficiency

Table 2.--Selected market structure statistics on the fruit and vegetable canning industry (SIC-2033), by States, 1963

States ranked by number of establishments	Establishments		Employees		Man-hours by production workers	Value added by manufacture	Value of production
	Total	With 20 or more employees	Total	Payroll			
	Number	Number	Thousand	Million dollars	Million hours	Million dollars	Million dollars
California	191	122	25	121	41	322	855
New York	130	73	7	27	13	65	197
Wisconsin	102	82	7	25	13	63	150
Ohio	71	28	2	9	4	30	85
Michigan	66	30	3	11	5	26	90
Indiana	64	36	3	10	5	30	75
Pennsylvania	63	31	4	14	7	49	124
Illinois	50	30	3	12	6	41	102
New Jersey	42	23	2	9	4	26	82
Texas	42	20	2	6	4	18	47
Oregon	41	26	4	15	6	34	79
Washington	36	24	3	13	5	37	92
Minnesota	27	22	3	9	5	29	67
Maine	23	11	1	2	1	4	11
Georgia	21	13	1	3	2	7	20
Arkansas	15	10	1	3	2	7	24
Colorado	14	8	1	3	2	4	14
South Carolina	12	7	0.4	1	0.4	2	5
Iowa	9	5	1	2	1	9	18
Idaho	7	5	1	2	1	6	13

Source: U.S. Census of Manufactures, (9).

Table 3.--Selected market structure statistics on the fruit and vegetable freezing industry (SIC-2037), by States, 1963

States ranked by number of establishments	Establishments		Employees		Man-hours by production workers	Value added by manufacture	Value of production
	Total	With 20 or more employees	Total	Payroll			
	Number	Number	Thousand	Million dollars	Million hours	Million dollars	Million dollars
California	102	62	8	34	12	77	219
New York	57	28	3	12	5	37	84
Illinois	43	15	2	12	4	35	76
Florida	40	30	5	21	9	94	335
Oregon	34	22	4	16	7	33	94
Idaho	15	10	3	10	5	20	49
Minnesota	13	7	2	6	3	13	35
Maine	11	9	2	7	4	18	36
Maryland	7	7	1	5	2	11	33
Delaware	6	4	1	2	1	4	9

Source: U.S. Census of Manufactures (9).

in materials handling and work flow. Use of forklift trucks and conveyor systems reduced the man-hours required to handle raw materials and finished products. Continuous cookers replaced batch methods in canneries. A continuous dehydrator with a belt-trough dryer was being used in 1965. Fruit is dried more uniformly with this method; in addition, labor costs are reduced. These examples illustrate only a few of many improvements in labor and management skills.

Potatoes

One of the more significant recent developments in the food industry has been the phenomenal growth of potato processing. In 1964, over 66 million hundredweight of potatoes--more than 25 percent of the quantity produced and a third of the quantity used for food in the United States--were processed into food products. In 1956, however, less than 25 million hundredweight of potatoes--about 10 percent of the amount produced and less than 15 percent of the potatoes used for food in this country--were processed for food purposes. In less than 10 years, the total quantity of potatoes shipped or utilized by food processors increased more than 150 percent.

In every year since 1956, about 50 percent of the processed potatoes have been chips or shoestrings; 25 percent, frozen french fries; 15 percent, dehydrated potato flakes or granules; and 10 percent, other canned and frozen products. Although more potatoes are being processed each year, some processing items are becoming more important than others. In 1956, for example, less than a third of the processed potatoes were in frozen or dehydrated products compared with more than 50 percent of the potatoes processed in 1964.

The recent developments in the potato processing industry have been particularly favorable in some of the production areas which are distant from markets. Most of the chip plants are market-area oriented and receive potatoes from many production areas. Plants engaged in the dehydration or manufacture of frozen potato products are usually located within the production area from which they receive their potatoes. By locating near the source of supply, these processors are able to substantially lower the cost of shipping their product to the market.

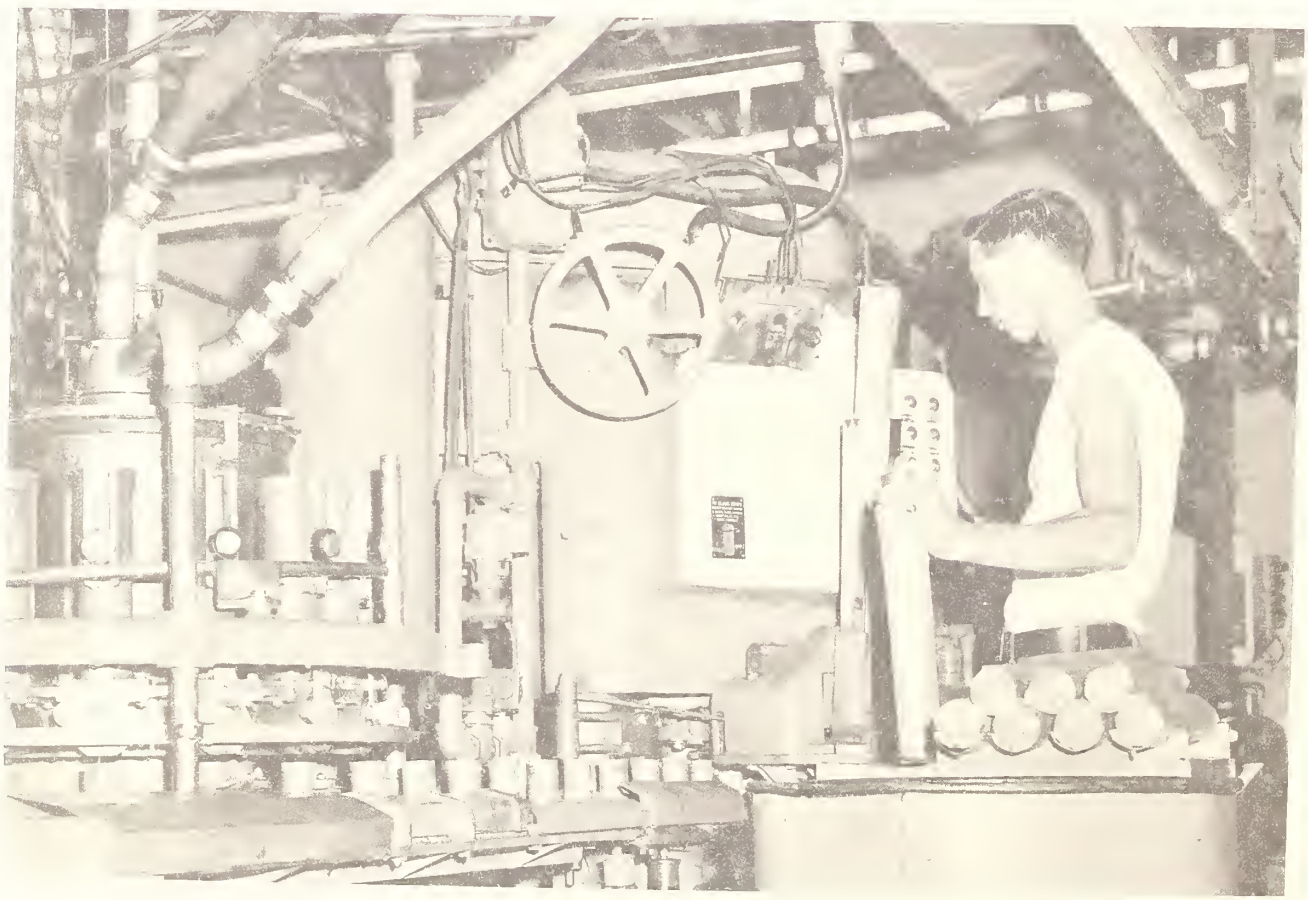
In 1964, about 60 percent of the potatoes processed into frozen or dehydrated products were processed in Idaho. During that year, about 50 percent of potatoes produced in Idaho were shipped to these processors. Although Idaho is-- and will probably remain--the most important potato processing State, many new processing plants have been built recently in other late summer and fall production areas.

The growing acceptance of processed potato products appears to have arrested or reversed the longtime downward trend in per capita potato consumption. At the turn of the century, consumers ate about 200 pounds of potatoes annually. By 1950, per capita consumption had declined to nearly 100 pounds. Since 1950, per capita consumption of fresh potatoes has continued to decline, but this decrease has been slightly more than offset by the increased consumption of processed potatoes. During this period, processors have improved their products; and consumers, as a result of increased incomes, have increased their demand for convenience foods.

CHANGES IN WHOLESALE MARKETS

One of the important changes in marketing fruits and vegetables has been the change in the structure of wholesale markets for both fresh and processed items.

In the photo top left, employees of a potato processing plant pick reject french fries from a conveyor. The machine pictured below can accurately fill and seal cans of orange concentrate at speeds as high as 400 per minute.



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Generally, the importance of the wholesaling function has declined as retailers and institutional buyers have made more and more of their purchases directly from processors or at shipping point.

Changes in Wholesaling Processed Fruits and Vegetables

According to the Census of Manufactures, nearly 80 percent of the dollar volume of manufacturers' sales of canned and dried fruits and vegetables was made to wholesalers in 1939, 15 percent to retailers, and 1 percent to industrial users. Exactly comparable data are not available from the Census for 1963, but available data show that, by that year, sales to wholesalers made up a much smaller proportion than in 1939, and sales to retail outlets and to industrial and institutional buyers--either directly or through manufacturers' sales branches--had risen substantially (table 4).

Table 4.--Distribution of merchant wholesaler sales, 1948, 1958, and 1963 1/

Sales and outlet	Canned foods			Frosted and frozen foods		
	1948	1958	1963	1948	1958	1963
	Percent	Percent	Percent	Percent	Percent	Percent
Industrial and commercial uses	11.3	7.2	13.2	17.4	15.3	25.6
Retailers	45.5	68.7	61.0	54.4	60.0	44.5
Wholesale organizations	29.7	20.3	21.0	23.3	23.9	27.7
Household consumers	.6	.8	.5	1.3	.5	.4
Export	12.9	3.0	4.3	3.1	1.2	1.8

1/ Does not include sales of brokers and agents.

Source: U.S. Census of Business (6, 8).

Changes in Wholesaling Fresh Fruits and Vegetables

According to a survey by the Economic Research Service (3), 2 million carlots of produce went through U. S. produce markets in the 1958-59 marketing year (fig. 3). The marketing system in which this occurred developed into the modern form approximately between 1880 and the mid-1920's, but since the twenties the organization and function of wholesale markets have continued to change.

Between the late thirties and the late fifties, the volume of fruits and vegetables sold by farmers and imported for the fresh market increased 12 percent. However, with direct purchasing by chains and other retail organizations increasing during this period, the total volume handled by produce wholesalers declined about 10 to 12 percent.

While there has been a constant turnover of firms, the size distribution of merchant wholesalers (firms physically handling produce) has been surprisingly constant. In each year of the Census of Business--1939, 1948, 1954, 1958, and 1963--5 percent of the merchant wholesalers made about one-third of total produce sales, 10 percent a little less than half, and 25 percent about three-fourths. In short, there is no evidence that large establishments have greatly increased their share of the market since 1939.

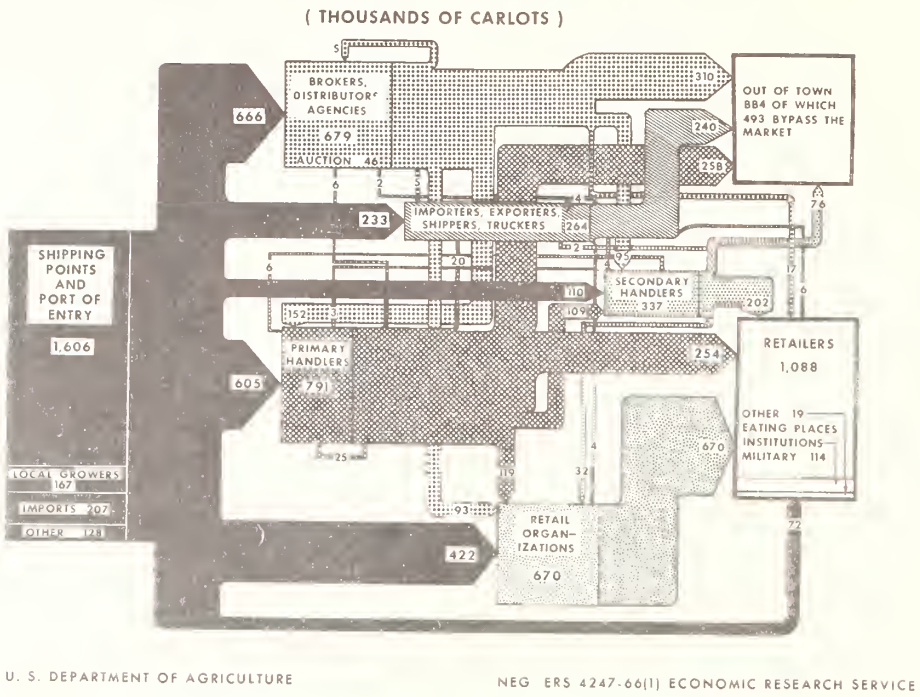

Figure 3

The wholesalers whose sales have grown since 1948 are those who shifted their outlets away from independent grocery stores and jobbers and toward retail organizations and institutional outlets. A 1920-21 study indicated that 65 percent of the volume moving to several eastern cities was sold on commission (5). At present, less than 40 percent of the receipts of wholesale handlers in those same cities are handled on consignment.

The major change in the brokerage business has been a shift toward more split cars--one carload divided among several buyers--and more mixed cars--one car containing several commodities. This shift has been especially important in the market region west of the Mississippi River.

The number of auction markets also has declined in recent years. Terminal auctions operated in 6 cities in 1965 compared with 20 auctions in 14 cities in 1931. Fruit auctions were at one time the major distributors for citrus and west coast deciduous fruits. In 1930, these auctions handled 84 percent of the citrus fruit received in auction cities and nearly as high a percentage of western deciduous fruits. They were the mass distributors at the wholesale level.

Auction sales declined from one-third of all fresh citrus and 10 percent of all fresh deciduous fruit sales in 1937 to 12.5 percent of the citrus and 6 percent of the deciduous fruit sales in 1962. About 45 percent of the citrus fruit and 38 percent of the western deciduous fruit received in the auction cities in 1962-63 were sold at auction.

The auctions are becoming specialty distributors rather than mass distributors. Sales of the higher valued fruits are holding up much better than those of lower

priced, large-quantity items. Chainstores and wholesalers prefer to buy their large-volume produce items directly from shipping points. The auctions seem well suited to the sale of imported fruit--most of it from Chile and Argentina--and the New York City auction probably will retain a large share of the sales of these commodities. Other auctions are in Boston, Chicago, Detroit, Philadelphia, and Pittsburgh.

Wholesale markets for fresh fruits and vegetables gradually are being forced to move from old inefficient locations in the larger cities to areas on the peripheries where land is cheaper and more adequate facilities can be built. Traditionally, wholesale markets consisted of multistory buildings on either side of narrow streets. The buildings were inefficient for servicing orders, and increased truck transport made the streets impassable during peak trading hours.

New markets built in many major cities consist of groups of 1-story buildings with rail docks on one side and wide truck-loading platforms on the other. These markets are food distribution centers that handle other food products in addition to fresh fruits and vegetables. The buildings are well adapted to the use of modern materials-handling equipment such as forklift trucks and conveyor belts. Each wholesale company has ample refrigerated storage facilities for holding fruits and vegetables. In some warehouses, several cold rooms are available, each with different temperature settings, so that each kind of fruit or vegetable may be stored at the proper temperature for optimum quality.

New, more convenient, and more efficient wholesale facilities have enabled some firms to become less specialized in the wholesale function. Firms now can handle a wider variety of fruits and vegetables and offer more services to customers. Many items that formerly were packaged at the retail or shipping point levels are now prepackaged in the new wholesale facilities. The number of firms prepackaging produce--especially tomatoes--has increased sharply in recent years, while the number of regular produce wholesalers has declined (3).

CHANGES IN RETAIL MARKET

National chains were first to adopt direct buying of fresh fruits and vegetables; but, by the late twenties, a number of large local and regional chains were engaged in direct buying. As early as 1936, 12 percent of the volume of fresh produce entering the major wholesale market areas was purchased at shipping points by chains. By the late fifties, direct buying at shipping points by incorporated and voluntary chains and retailer-owned cooperatives accounted for more than a fourth of the total receipts in 52 large cities.

Procurement methods and buying practices of different purchasing groups vary, but there are broad similarities within the major types. Each of the national retail food chains has an extensive field-buying staff with offices (year-round or seasonal) in the major producing areas. These buyers, who are familiar with supplies in the area and the requirements of their firms, can buy from growers and shippers on the basis of actual inspections. The national chains buy about 70 percent of their total supplies directly at shipping points, and nearly all purchases are made by their field buyers.

The regional chains--those with produce warehouse divisions in different cities--are not large enough to maintain field buying offices as extensive as the national chains, but many have field offices in major production areas. The regional chains

In June 1959, the Dock Street Market in Philadelphia, shown above, was replaced with a modern, spacious facility, pictured below.

buy about one-half of their supplies directly at shipping points. Of their direct purchases, about 45 percent are made through their field buyers and another 45 percent from the central office by telephone. The remaining 10 percent are purchased for them at shipping points by brokers.

Local chains--those with only one warehouse--usually do not have their own field buying staffs. They purchase less than 30 percent of their volume of produce at shipping points. Of these direct purchases, nearly two-thirds are made by telephone directly from the shipper, and the remaining one-third through buying brokers at shipping points.

Only a few wholesaler-sponsored voluntary food chains handle fresh fruits and vegetables. They buy about one-third of their produce directly from shipping points--about three-fourths by telephone, and the remainder through brokers buying at shipping points.

The retailer cooperatives--wholesale organizations owned by member retailers--buy approximately 13 percent of their volume directly from shipping points. About two-thirds of their direct buying is done through shipping-point buying brokers and one-third by telephone.

Retail food chains have adopted direct buying of fruits and vegetables to obtain the quality and volume of product they need. Direct buying also avoids terminal market brokerage fees and other selling costs, which have often been high because of inadequate facilities, traffic congestion, and high cartage charges.

City wholesalers still play an important role in marketing fresh fruits and vegetables despite the above indicated increases in direct buying. Large chains do some buying from city market dealers, and many medium-size and smaller chains buy all but a few large-volume fresh fruit and vegetable items--such as potatoes, onions, and citrus fruits--from city dealers. The smallest chains, unaffiliated independent retailers, restaurants, and institutions generally buy all their fresh produce from city dealers.

Produce prepackaging and the repacking of tomatoes in consumer units has developed since the 1930's. A few retail organizations prepackage every item in the produce department while others put the main emphasis on bulk displays with prepackaging confined to a few items such as potatoes, onions, carrots, grapefruit, and perhaps some apples. Some of the larger retail organizations also have banana rooms.

CHANGES IN PRODUCER MARKETING PRACTICES

To improve their competitive position with the large buyers of fruits and vegetables, producers have banded together in various arrangements. Because the individual farmer has little bargaining power against the large processor or chain buyer, State and Federal Governments have passed several types of legislation to assist the farmer in obtaining equitable prices for his fruits and vegetables. This section briefly notes some of the actions taken to assist producers in marketing their products.

Fruit and Vegetable Marketing Cooperatives

Approximately 25 percent of all fruits and vegetables move through farmer

cooperatives in one or more stages of the marketing process. In 1963, there were approximately 600 fruit and vegetable marketing cooperatives in operation in the United States. Although the number of these cooperatives has been declining, most of this decline has resulted from mergers or consolidations among cooperative organizations. From 1951 to 1963, the total number of fruit and vegetable marketing cooperatives decreased by 30 percent, while the net value of fruits and vegetables sold through these organizations increased by about 80 percent (fig. 4).

Bargaining Associations

Bargaining associations or cooperatives, unlike most marketing cooperatives, usually do not physically handle the product but only act as agents for producers in establishing uniform contracts between buyers and their members. Bargaining associations are extremely important for those crops which are processed. These organizations are not new, having been used by dairy producers for many years. Nearly all of the 40 or more fruit and vegetable bargaining associations in existence today were organized within the last 10 years (4).

Formal and Informal Contracts

Another noticeable trend occurring in the fruit and vegetable industry is the increasing importance of contracts between producers and processors. For certain vegetable crops such as peas, corn, beets, lima beans, spinach, and asparagus, an estimated 90 to 100 percent of the crop for processing is contracted with producers. For tomatoes, carrots, and snap beans, it is estimated that over 75 percent of the processed crop is contracted. In recent years, there has been considerable growth in contract farming in the potato industry. With the possible exception of the citrus industry, it is doubtful that contracts between growers and processors are as important in the fruit as in the vegetable industry.

Although such contracts may be favorable or unfavorable to producers in any given year, over the long run they are probably favorable to both producers and processors, assuring the producer of his markets and the price or prices he may receive and assuring the processor of his source of supply. The terms of the contract may specify a number of different price formulas based on specific grades, sizes, etc. Some of the contracts may have escape clauses releasing the grower or processor from the contract if the fresh-market price diverges widely from the stipulated processed price. The actual use of contracts varies not only with the type of product or commodity being processed but also between production areas. Generally, this may be attributed to the number of alternative market outlets readily available to producers within the production area.

Market Order Programs

Marketing agreement and order programs have provided producers with another method of maintaining or increasing their bargaining power. Market orders are quasi-governmental programs designed to help producers and handlers improve their marketing practices and thereby improve producers' returns. These programs may be enacted under State or Federal legislation. Under State programs, primary emphasis is placed upon promotion activities; under Federal programs, greater emphasis is placed on improving marketing practices and encouraging more orderly marketing.

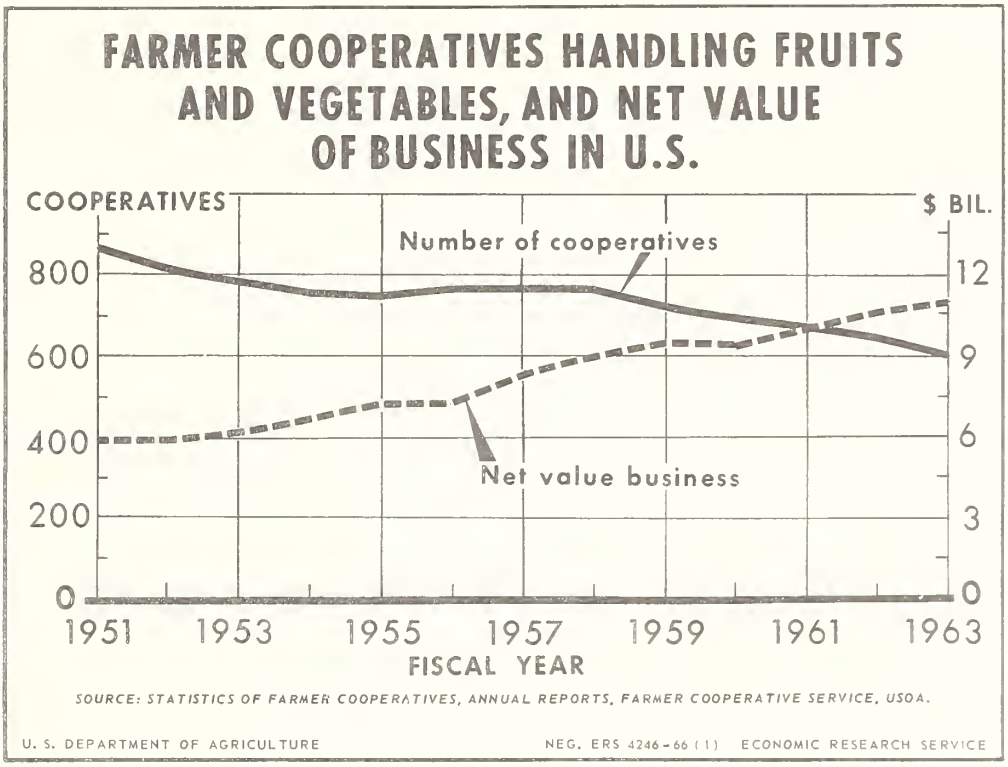

Figure 4

At the beginning of 1966, there were 48 Federal marketing agreements and orders in effect for fruits, vegetables, and tree nuts (table 5). Over $0.5 billion worth of these products, accounting for between 25 to 30 percent of the total farm value of fresh-market sales, are produced annually in areas operating under these programs. 5/ Marketing order programs provide producers and handlers with a variety of tools which they may use to improve their marketing practices. Regulations affecting marketing practices within a market order area are recommended through administrative committees of producers or producers and handlers. These recommendations are submitted to the Secretary of Agriculture for approval, and upon approval become binding on all handlers operating within the market order area.

Recent amendments to the enabling act permit some commodity groups to engage in advertising and promotion activities under Federal marketing order programs. Previously most of the advertising and promotional activity conducted by producer groups in Federal marketing order areas was done under State programs. Although none of the existing Federal orders has undertaken advertising and promotion activities under the new legislation, this provision of the act should increase the interest and usefulness of Federal marketing order programs in the industry.

Direct volume control, in which supplies or part of the supplies are withheld from specific markets, have been used more often for storable commodities that are primarily produced in, or under, the control of the order.

5/ In 1965, approximately 100 percent of the citrus fruits, 15 percent of the noncitrus fruits, 55 percent of the tree nuts, 35 percent of the potatoes, and 5 percent of the other vegetable crops produced in the United States were marketed under Federal market order programs.

Table 5.--Federal fruit and vegetable marketing agreements and orders: Number of programs in effect and active by commodity groups, and regulations authorized, January 1, 1966

Item	Potatoes	Other vegetables	Citrus fruits	Other fruits	Tree nuts and special crops	Total
	No.	No.	No.	No.	No.	No.
Programs in effect	8	8	9	16	7	48
Active programs	4	6	9	15	7	41
Regulations authorized controlling:						
Grade	8	7	4	15	6	40
Size	8	7	7	15	6	43
Quality	8	6	4	13	6	37
Maturity	6	5	3	12	--	26
Rate of flow	--	1	5	2	--	8
Shipping and packing holidays 1/	--	4	1	--	--	5
Volume control 2/	1	1	--	1	5	8
Container or pack	5	7	2	9	4	27
Research and development	2	6	6	12	5	31
Inspection and certification	8	7	5	15	7	42

1/ Regulations prohibiting the packing or shipping of product in order area during specified time period.

2/ Regulations specifying the total quantity or percentage of crop which can be shipped to specified market outlets.

The increasing growth of the processing industry has important implications to the effectiveness of marketing order programs in improving returns to producers. Many of the processing outlets are either specifically exempt from marketing order regulations or are not regulated under these programs. The trend toward increased consumption of processed products and declining consumption of fresh products results in decreasing the proportion of the total crop subject to quality or other marketing order regulations. Although improving the quality in the fresh market may increase the demand for the fresh product, these regulations may also reduce the supplies shipped to this market while increasing those shipped to processors. In some instances, processors have been able to convert lower quality raw products into foods that are highly competitive with higher quality fresh products.

The extent to which marketing order programs have improved producers' bargaining power is difficult to measure. Whatever may be the impact of marketing regulations, marketing order programs may provide a useful service to producer groups by enabling them to collect and disseminate marketing information that may not otherwise be available. Such programs also frequently provide the nucleus for the organization of grower meetings in which marketing problems are thoroughly discussed.

Promotion by Farm Groups

Individual agricultural producers are generally not large enough to justify or support promotion of their products. Marketing and price problems created by abundant supplies, increased specialization in the production and marketing of agricultural products at the farm level, and mass merchandizing self-service supermarkets at the retail level have challenged producers to give increased attention to promotion to maintain or expand the demand for their products. In many instances, efforts of producer groups to promote their products have been supported by processors, shippers, and others.

Quality Standards and Trademarks

Such agencies as the Federal-State Market News Service and the Federal-State Fruit and Vegetable Inspection Service play important roles in the produce industry by providing the producers with services that enable them to assert and protect their bargaining strength. The Market News Service keeps producers posted on prices paid to other producers in the market for various grades or qualities, while the Inspection Service provides producers and sellers with a means of insuring themselves against unjust claims of buyers and receivers with respect to quality and condition of their merchandise.

In addition to the official grade standards established by the Federal Government, a number of States have established their own grades. Many States have "seal of quality" programs which require commodities to meet certain grade, pack, and quality standards before the seal can be affixed on the container. These programs are usually supplemented with strong promotional programs designed to extoll the virtues of the products sold under the seals.

Extending the Marketing Season

In addition to promotional programs, cooperative marketing organizations, and marketing order programs, producer-oriented groups have initiated and financed research programs concerned with developing or extending the market or marketing period for their product. Probably one of the more significant new developments that has occurred in the produce industry has been controlled-atmosphere storage. This type of storage has been particularly important in the apple industry where the controlled-atmosphere storage capacity has been increasing at the rate of 1 million bushels a year during the past decade. Currently, about one-fifth of all stored apples are in controlled atmosphere facilities. Similar developments have occurred in the potato and onion industry, where the use of sprout inhibitors and other decay-reducing agents have enabled producers to extend their marketing seasons. The contributions of such developments to farmers' bargaining power have been considerable, not only providing the farmer or producer with a longer marketing period, but also permitting more orderly marketing practices.

THE OUTLOOK FOR MARKETING FRUITS AND VEGETABLES

Impact of Population Changes

The total volume of fruits and vegetables marketed will increase in the years ahead, mainly because of population growth. Continued movement of families from rural to urban areas also will add to total demand for commercially produced fruits

and vegetables, since many farm families produce part or all of the fruits and vegetables they consume. Changes in the geographical distribution of the population may affect the production and marketing of these products. Population is expected to expand greatly in or near some of the areas best adapted for fruit and vegetable production--the Pacific Coast States and Florida. Increased demand for land for nonagricultural uses already has curtailed production and increased costs in parts of these States. Competition for land and water will increase. However, population growth in and near the producing areas will tend to reduce transportation costs for these products.

The Effect of Income on Demand

The expected rise in per capita disposable income may increase the demand for many fruit and vegetable products, depending on relative prices of all foods and the supply response. However, per capita consumption is likely to respond only slightly to increases in income over the next few years. Gains in income will affect consumption of some fruits and vegetables more than others. Generally, the largest increases arising from income growth will be in the consumption of processed products.

These conclusions are based on the results of two independent calculations of consumption-income relations, one using time-series data and the other household-budget data. Daly, using time-series data and a trend variable to allow for changes in taste, estimated that coefficients of income elasticity for vegetable products ranged from -0.1 for white potatoes to 0.4 for frozen vegetables, fresh leafy green and yellow vegetables, and tomatoes. 6/ Elasticities for fruits ranged from 0.0 for dried fruits to 0.8 for processed citrus products. For fresh citrus fruits, the elasticity was 0.6; and for fresh apples, 0.2. Waldorf, using data from the Household Food Consumption Survey conducted by the U.S. Department of Agriculture in 1955, found that income elasticities were higher for processed than for fresh fruits and vegetables; and of the processed products, elasticities were highest for frozen products (10).

Thus, income elasticities indicate that the shift in consumption during the last decade from fresh to processed products will continue and that the largest increases will be in the consumption of frozen products. This shift, however, will also be affected by changes in prices of processed fruits and vegetables relative to those of the fresh products. Per capita consumption of all fruits and vegetables may not rise significantly from levels of the past decade.

Increased Volume of Processing

Several factors in addition to the growing population and rising income per capita are expected to increase the volume of fruits and vegetables processed. Among these factors are (1) a burgeoning demand for convenience foods, (2) development of new and improved products, and (3) use of new technologies.

Increased employment of women outside the home and their desire to devote more time to activities outside the kitchen, coupled with rising incomes, have accounted

6/ Daly, Rex F.-A Profile of Agriculture Projected to 1968. Unpublished notes and materials for discussion at the Great Plains and Western Outlook Conference, July 22, 1963.

for much of the increased use of convenience foods. These factors will continue to boost demand for these products.

The development of new products--frozen orange juice concentrate, for example--and improvements in the quality of products have contributed greatly to the increase in processing. Fruit and vegetable processing firms are spending large sums on developing new and improved products. One may expect that these efforts will result in more processing.

Several new methods of processing fruits and vegetables are now in experimental stages of development or have been used commercially only for processing small volumes of high-value products. These new methods may be much more widely used in the future. Dehydrofreezing, a promising new method of freezing, has been used commercially to process fruits and vegetables on a limited scale. As the name implies, much of the water is removed before a product is frozen, thus reducing its bulk and weight. Costs of packaging and shipping are smaller for these products than for conventionally frozen products, but dehydration adds to processing costs.

A growing volume of fruits and vegetables may be processed by freeze-drying, a method by which moisture is largely removed from conventionally frozen products. The final product is a dried, not a frozen, product. It is lightweight, and may be shipped and stored without refrigeration Freeze-dried foods retain more of the flavor of the original product than do most foods dried by heat. Freeze-drying, however, is more expensive than other processing methods. At present, its greatest potential for fruit processing seems to be in freeze-drying berries and other fruits for use by bakeries and other food manufacturers. Vegetables now are freeze-dried for use in soups and other products; the volume processed this way may grow. The foammat and vaccum-puff methods of drying show promise for making instant mixes and for making dried granules and flakes that can be reconstituted. Aseptic canning, a new technique, produces higher quality canned fruits and vegetables than are now available. Research is continuing to improve various methods of processing.

Further Growth in Direct Buying

Retail firms probably will increase their direct purchases from dealers at shipping point. The number of retail food chains large enough to engage in direct buying is likely to increase because of mergers and the opening of new stores. Further, chains now doing some direct buying may increase this buying. Direct buying is not expected to account for more than 60 percent of the total volume of fresh fruits and vegetables marketed in the foreseeable future. Three groups of customers depending heavily on city wholesalers will probably keep the wholesalers' market share from decreasing to less than 40 percent of total marketings. These groups are (1) restaurants, hotels, and institutional buyers, few of which are large enough to buy directly from shipping point dealers; (2) unaffiliated independent grocery stores; and (3) chainstores that buy specialty items, prepackaged items, and fill-in supplies from local wholesalers.

SUMMARY

The fruit and vegetable industries accounted for nearly $15 billion in retail food store sales in 1965. Of this, nearly $11 billion went to a marketing system which has been developed (mostly in the past five decades) to move fresh and processed produce over ever-increasing distances and in ever-changing array from producers to consumers.

For a number of sociological and economic reasons, consumers have increased their consumption of processed fruits and vegetables at the expense of the fresh. Consumption of all fruits and vegetables, on a fresh-weight basis, has declined in the past two decades.

Among the many reasons for the shift from fresh to processed fruits and vegetables are the relative prices of the two. Marketers of fresh fruits and vegetables have not been able to increase marketing efficiency or obtain the economies of large operations that processors have. Therefore, prices for processed fruits and vegtables have increased less than prices for the fresh. This has been reflected in relatively lower prices for processed than for fresh fruits and vegetables on the retail shelves. Consumers, seeing the price advantage of processed foods and also wanting the conveniences, have changed to the canned and frozen items.

Increased competition among processors and among the types of processing fostered research to develop more efficient methods of processing that would at the same time yield products of higher quality. This research has met with notable success. Meanwhile, marketers of fresh fruits and vegetables have met with only limited success in increasing the efficiency of their marketing system.

Coincident with the technological revolutions that have taken place in the production, processing, and transportation of fruits and vegetables have been dramatic changes in the structure of wholesale and retail markets for these items. The growth of large buyers (chainstores and industrial and institutional outlets) has led to direct buying of fresh and processed fruits and vegetables from dealers at shipping points or from manufacturers. Traditional wholesale outlets for these items are declining in importance.

The increasing size and number of large buyers also has forced growers to take action to improve their competitive position. To achieve more bargaining power, many producers have taken collective action in the form of cooperative marketing associations, trade and promotion associations, marketing agreement and order programs, and other self-help measures.

Increased volumes of fruits and vegetables will be marketed in the years ahead. However, the additional quantities are expected to correspond with population growth. Per capita consumption of fruits and vegetables is expected to remain at about present levels, but further shifts from fresh to processed items are expected.

LITERATURE CITED

(1) Hiemstra, S. J.
1965. U.S. Food Consumption: Sources of Data and Trends, 1909-63. U.S. Dept. Agr. Statis. Bul. 364, June.

(2) _____
1965. Supplement for 1964 to U.S. Food Consumption: Sources of Data and Trends, 1909-63. U.S. Dept. Agr. Sup. to Statis. Bul. 364, Oct.

(3) Manchester, A. C.
1964. The Structure of Wholesale Produce Markets. U.S. Dept. Agr., Agr. Econ. Rpt. 45, Apr.

(4) McMillan, W. M.
1958. Fruit and Vegetable Bargaining Cooperatives. U.S. Dept. Agr. FCS Cir. 25, Nov.

(5) Phillips, R. G.
1922. Wholesale Distribution of Fresh Fruits and Vegetables. Report of the Joint Council of the National League of Commission Merchants of the United States. Fish-Lyman Co., Inc., Rochester, N. Y.

(6) U.S. Bureau of the Census
1952. U.S. Census of Business: 1948. Vol. IV. Wholesale Trade--General Statistics and Commodity Line Sales Statistics U.S. Govt. Printing Off., Washington, D. C.

(7) _____
1957. Concentration Ratios in Manufacturing Industry, 1958. Report prepared by the Bur. of the Census for the Subcommittee on Antitrust and Monopoly of the U.S. Senate, 87th Cong., 2d Sess.

(8) _____
1961. U.S. Census of Business: 1958. Vol. III. Wholesale Trade--General Statistics. U.S. Govt. Printing Off., Washington, D.C.

(9) _____
1961. U.S. Census of Manufactures: 1958. Vols. I and II. Industry Statistics. U.S. Govt. Printing Off., Washington, D.C.

(10) Waldorf, W. H.
1960. Output of Factories Processing Farm Food Products in the United States, 1909-1958. U.S. Dept. Agr. Tech. Bul. 1223, Sept.

(11) _____
1961. Output per Man-Hour in Factories Processing Farm Food Products. U.S. Dept. Agr. Tech. Bul. 1243, May.

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